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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,640	10/09/2001	Michael Charles Olewine	US 018167	6235

7590

05/08/2003

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EXAMINER

NGUYEN, DAO H

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/973,640

Applicant(s)

OLEWINE ET AL.

Examiner

Dao H Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-29 and 47-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-29 and 47-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. In response to the communications dated 03/05/2003, claims 20-29, and 47-50 are active in this application as a result of the cancellation of claims 1-19, 30-46, and 51-62.

Acknowledges

2. Receipt is acknowledged of the following items from the Applicant.

Information Disclosure Statement (IDS) filed on 10/09/2001 and made of record as Paper No. 5. The references cited on the PTOL 1449 form have been considered.

3. Applicant made a provisional election without traverse to prosecute the invention of Group I, claims 20-29, and 47-50, and a cancellation of Group II, claims 1-19, 30-46, and 51-62. Affirmation of these election and cancellation was made in the Response to Restriction Requirement, and made of record as Paper No. 8.

Applicant has the right to file a divisional application covering the subject matter of the non-elected claims.

Specification

4. The specification has been checked to the extent necessary to determine the presence of possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 28 and 29 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 28 and 29, the limitations "positive serpentine pattern" and "negative serpentine pattern" are not clearly defined and distinctly pointed out the subject matter which is claimed as the Applicant's invention. What does positive and negative serpentine pattern mean?

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

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to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 20-27, and 47-50 are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 5,895,239 to Jeng et al., in view of the following remarks.

Regarding claim 20, Jeng discloses a metal-insulator-metal (MIM) capacitor structure for use in an integrated circuit, as shown in figure 14, the MIM capacitor structure comprising:

first and second legs (capacitors defined above conducting layers 32B) extending generally parallel to one another and defining a channel therebetween (region between two electrodes 44' above conducting layer 32A), each leg including top and bottom electrodes 50 and 44' respectively, an insulator layer 48 interposed between the top and bottom electrodes 50 and 44', and a sidewall that faces the channel; and

a sidewall spacer (38, 32A, 34', and 34'') extending along the channel, the sidewall spacer including a conductive layer 32A and a dielectric insulator layer 38 interposed between the conductive layer 32A and the sidewall of the first leg, wherein the conductive layer 32A of the sidewall spacer is physically separated from the top electrode 50.

Note that though Jeng does not name the conducting layer 32A a sidewall spacer or part of the sidewall spacer, it would have been obvious to one having ordinary skill in the art that the conducting layer 32A could function as a sidewall spacer to support, along with the sidewall spacer 38, the bottom electrode 44'. See figure.

Regarding claim 21, Jeng discloses the MIM capacitor structure wherein the bottom electrode 44' for the first leg comprises titanium nitride. See column 8, lines 11-17.

Regarding claim 22, Jeng discloses the MIM capacitor structure wherein the bottom electrode for the first leg further includes an interconnect layer 32B upon which the titanium nitride 44' is deposited. See figure.

Regarding claim 23, Jeng discloses the MIM capacitor structure wherein the titanium nitride includes an ammonia plasma treated surface. See column 6, lines 35-65; column 7, lines 25-58.

Regarding claim 24, Jeng discloses the MIM capacitor structure wherein the insulator layer 48 for the first leg, and the dielectric layer 38 in the sidewall spacer, each comprise a high dielectric constant material. See column 7, lines 17-37; column 8, lines 11-17.

Regarding claim 25, Jeng discloses the MIM capacitor structure wherein the high dielectric constant material in the insulator layer for the first leg and the dielectric layer in the sidewall spacer is tantalum pentoxide. See column 8, lines 11-17.

Regarding claim 26, Jeng discloses the MIM capacitor structure wherein the top electrode for the first leg includes titanium nitride. See column 8, lines 18-23.

Regarding claim 27, Jeng discloses the MIM capacitor structure wherein the first and second legs are defined within a serpentine pattern. See figure.

Regarding claim 47, Jeng discloses a metal-insulator-metal (MIM) capacitor structure for use in an integrated circuit, as shown in figure 14, the MIM capacitor structure comprising:

top and bottom electrodes 50 and 44', wherein the bottom electrodes 44' includes an ammonia plasma treated surface; and

an insulator layer 48 interposed between the top electrode 50 and the ammonia plasma treated surface of the bottom electrode 44'. See also column 7, lines 38-52.

Regarding claim 48, Jeng discloses the MIM capacitor structure wherein the ammonia plasma treated surface comprises titanium nitride. See column 7, lines 38-52.

Regarding claim 49, Jeng discloses the MIM capacitor structure wherein the insulator layer 48 comprises tantalum pentoxide. See column 8, lines 12-17.

Regarding claim 50, Jeng discloses the MIM capacitor structure wherein the ammonia plasma treated surface is substantially free of titanium oxide as a result of

bombardment of the ammonia plasma treated surface with nitrogen ions. This is inherent.

Conclusion

9. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao H. Nguyen whose telephone number is (703) 305-1957. The examiner can normally be reached on Monday-Friday, 9:00 AM – 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (703) 308 - 4910. The fax numbers for Customer Service is (703) 872-9317, for the organization where this application proceeding is assigned is (703) 872-9318 for regular (Before Final) communications or (703) 872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Dao H. Nguyen
Art Unit 2818
April 28, 2003



HOAI HO
PRIMARY EXAMINER